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H. Duane Switzer, Jones Day
North Point
901 Lakeside Avenue
Cleveland, OH 44114-1190

EXAMINER

JOYCE, WILLIAM C

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PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ALAN CHARLES WEBB, PETER HOLLAND,
PETER STANDRING, DOUGLAS H. SMITH, and
LARRY L. BAHNEY

Appeal 2008-3318
Application 10/784,459
Technology Center 3600

Decided:¹ March 26, 2009

Before: WILLIAM F. PATE, III, JENNIFER D. BAHR and
JOHN C. KERINS, *Administrative Patent Judges*.

PATE, III, *Administrative Patent Judge*.

DECISION ON APPEAL

¹ The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

STATEMENT OF CASE

Appellants appeal under 35 U.S.C. § 134 from a rejection of claims 61-76, 80 and 81. We have jurisdiction under 35 U.S.C. § 6(b).

The claims are directed to a spindle that is fixedly assembled to a surrounding component by deforming a portion of the spindle to engage and retain the component.

Claim 61 is illustrative of the claimed subject matter and is reproduced below:

61. In combination:
a spindle (14) having a component (26) secured thereto by a formed end (20) that is formed by deformation of a deformable annular end portion (71) on the spindle;
the component having a cylindrical opening (27) therethrough and an outer face (32);
the spindle (14) having a spindle rotational axis (X FIG. 1), a spindle outer surface (15) and a deformable annular end portion (71) with an outer end (78);
the spindle (14) having an inner beveled surface (68) that is inclined inwardly toward the spindle rotational axis (X FIG. 1) from the deformable annular end portion (71);
the deformable annular end portion (71) having a cylindrical outer surface (71a) and a tapered inner surface (72, 74) that tapers outwardly away from the spindle rotational axis (X) toward the outer end (78) so that the deformable annular end portion (71) decreases in radial thickness (between outer surface 71 a and inner surface 72, 74) along its length in a direction toward its outer end (78);
the deformable annular end portion (71) being received through the opening (27) in the component (26) and being deformed generally radially outwardly and axially into a formed end (20) that holds the component (26) on the spindle (14), the deformation being such that the cylindrical outer surface (71a) of the deformable annular end portion (71) becomes an inner face (58) of the formed end (20) that extends outwardly of the spindle rotational axis (X) in engagement with the outer face

(32) of the component (26), the deformation further being such that the formed end (20) has a peripheral outside corner (64) located closely adjacent the outer face (32) of the component (26);

the deformable annular end portion (71) being deformed and worked so that both the outer end (78) and at least a portion of the tapered inner surface (72, 74) of the deformable annular end portion (71) are formed into a single curved outside surface (60) on the formed end (20) that faces outwardly generally axially of the spindle axis and curves smoothly along its length toward the spindle rotational axis (X) from the peripheral outside corner (64) of the formed end (20) that is located closely adjacent the outer face (32) of the component (26);

the curved outside surface (60) on the formed end (20) being continuously curved from the peripheral outside corner (64) of the formed end (20) adjacent the outer face (32) of the component (26) so that a point traveling along the curved outside surface (60) moves both axially outwardly and radially inwardly of the spindle axis and the thickness of the formed end (20) in a direction axially of the spindle rotational axis gradually increases along its length generally radially of the spindle axis in a direction from the peripheral outside corner (64) of the formed end (20) toward the spindle rotational axis (X).

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Hofmann

5,490,732

Feb. 13, 1996

There are 21 claims pending in the application, namely, claims 61-81. Claims 77-79 are allowed. Claims 1-60 have been cancelled. Claims 61-76, 80 and 81 have been rejected under 35 U.S.C. §112, first and second paragraphs. The rejection under 35 U.S.C. §112, first paragraph has been withdrawn by the Examiner and is not before us for consideration. Answer:

3. Claims 61-76, 80 and 81 are additionally rejected under 35 U.S.C. §102(e) as being anticipated by Hofmann.

ISSUES

1. Have Appellants established that the Examiner has erred in rejecting claims 61-76, 80 and 81 under 35 U.S.C. §112, second paragraph?
2. Have Appellants established that the Examiner has erred in rejecting claims 61-76, 80 and 81 under 35 U.S.C. §102(e) as being anticipated by Hofmann?

FINDINGS OF FACT

1. As required by claim 80, the Figure 2² embodiment of Hofmann discloses a spindle 1 having a component 2-5 secured thereto by a formed end (“bead”) 9 (Fig. 3) that is formed by deformation of a deformable annular end portion (col. 2, ll. 63-67) on the spindle 1; the component 2-5 having a cylindrical opening therethrough (Fig. 2) and an outer face (surface of 3 above arrow r in Fig. 3); the spindle 1 having a spindle rotational axis (broken line Fig. 2), a spindle outer surface (surface of 1 against radially inner surface of 2, 3) and a deformable annular end portion (shown deformed at 9³; col. 2, ll. 63-67) with an outer end (surface to the left and below reference character α in Fig. 3); the spindle 1 having an inner

² Figure 3 is a close up of the Figure 1 embodiment. Since a close-up of the Figure 2 embodiment is not provided in Hofmann, reference is made to features of the enlarged Figure 3 view of the Figure 1 embodiment to refer to elements present in both the Figure 1 and the Figure 2 embodiments.

³ It is noted that reference numeral 10, mentioned in the Specification of Hofmann as referring to the undeformed hub barrel, is not depicted in the drawings.

beveled surface 9'' (Fig. 2) that is inclined inwardly toward the spindle rotational axis (broken line Fig. 2) from the deformable annular end portion (forming 9); the deformable annular end portion (forming 9) having a cylindrical outer surface (surface of 1 adjacent to the edge of 3 referenced by arrow r in Fig. 3) and a tapered inner surface (surface of 9 on each side of arrow R; col. 4, l. 22) that intersects (the corner above 9' in Fig. 3 as replaced by the shoulder 9'' of the Fig. 2 embodiment) the inner beveled surface 9''; the tapered inner surface (proximate R) tapering outwardly (by α and β) away from the spindle rotational axis (broken line Fig. 2) from its intersection with the inner beveled surface 9'' in a direction toward the outer end (surface to the left and below reference character α in Fig. 3) so that the deformable annular end portion (forming 9) decreases in radial thickness (col. 3, ll. 20-25) along its length in a direction (outward in Fig. 2; upward in Fig. 3) toward its outer end (surface to the left and below reference character α in Fig. 3); the deformable annular end portion (forming 9) being received through the opening (within 2, 3) in the component 2-5 and being deformed generally radially outwardly (outward in Fig. 2; upward in Fig. 3) and axially (leftward along broken line in Fig. 2) into a formed end 9 that holds (col. 1, ll. 65-67) the component 2-5 on the spindle 1, the deformation being such that the cylindrical outer surface (surface of 1 adjacent to the edge of 3 referenced by arrow r in Fig. 3) of the deformable annular end portion (forming 9) becomes an inner face (surface of 1 adjacent to the edge of 3 referenced by arrow r in Fig. 3) of the formed end 9 that extends outwardly (outward in Fig. 2; upward in Fig. 3) of the spindle rotational axis (broken line Fig. 2) in engagement

with the outer face (surface of 3 above arrow r in Fig. 3) of the component 2-5; and the tapered inner surface (proximate R) of the deformable annular end portion (forming 9) being outwardly (outward in Fig. 2; upward in Fig. 3) deformed along its length (forming R; col. 4, ll. 16-18) from adjacent its intersection (corner above 9') with the inner beveled surface 9'' to its outer end (surface to the left and below reference character α in Fig. 3).

2. As required by claim 81, the Figure 2 embodiment of Hofmann discloses the inner face (surface of 1 adjacent to the edge of 3 referenced by arrow r in Fig. 3) of the formed end 9 merges with the spindle outer surface (surface of 1 against radially inner surface of 2, 3) along an inside comer (at r), and the intersection (corner above 9') between an⁴ outer surface (surface having curve R) of the formed end 9 and said inner beveled surface 9'' is located generally diagonally opposite (e.g. on opposite side of the portion of 1 defining β in the direction of diagonal cross hatching of 1 shown in Fig. 3) from said inside comer (at r).
3. Hofmann fails to disclose "a single curved outside surface (60) on the formed end (20) that faces outwardly generally axially of the spindle axis and curves smoothly along its length toward the spindle rotational axis (X) from the peripheral outside comer (64) of the formed end (20) that is located closely adjacent the outer face (32) of the component (26); the curved outside surface (60) on the formed end (20) being continuously curved from the peripheral outside comer (64) of the formed end (20)

⁴ The phrase "the outer surface (60, 62, 66) of the formed end (20)" is interpreted to read as "an outer surface (60, 62, 66) of the formed end (20)"

adjacent the outer face (32) of the component (26) so that a point traveling along the curved outside surface (60) moves both axially outwardly and radially inwardly of the spindle axis,” as recited in claims 61 and 70.

4. The ordinary meaning of the term “corner” is “the position at which two lines, surfaces, or edges meet and form an angle.” THE AMERICAN HERITAGE® DICTIONARY OF THE ENGLISH LANGUAGE: FOURTH EDITION (2000).

PRINCIPLES OF LAW

With regard to the requirement, set forth in the second paragraph of 35 U.S.C. § 112, for “particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention,” it has been stated that the “essence of that requirement is that the language of the claims must make it clear what subject matter they encompass.” *In re Hammack*, 427 F.2d 1378, 1382 (CCPA 1970). This has been frequently stated in a shortened form as a requirement that the claims set forth the “metes and bounds” of their coverage. *See, e.g., In re Venezia*, 530 F.2d 956, 958 (CCPA 1976); *In re Goffe*, 526 F.2d 1393, 1397 (CCPA 1975); *In re Watson*, 517 F.2d 465, 477 (CCPA 1975); *In re Knowlton*, 481 F.2d 1357, 1366, (CCPA 1973). This requirement has usually been viewed from the perspective of a potential infringer, “so that they may more readily and accurately determine the boundaries of protection involved and evaluate the possibility of infringement and dominance.” *Hammack*, 427 F.2d at 1382.

since antecedent basis has not been established for that surface. Appropriate correction should be required in any further prosecution.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir.1987).

When the reference does not disclose that the drawings are to scale and is silent as to dimensions, arguments based on measurement of the drawing features are of little value. See *Hockerson-Halberstadt, Inc. v. Avia Group Int'l*, 222 F.3d 951, 956 (Fed. Cir. 2000) (The disclosure gave no indication that the drawings were drawn to scale. "[I]t is well established that patent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue.").

ANALYSIS

The rejection of claims 61-76, 80 and 81 under 35 U.S.C. §112, second paragraph is affirmed.

Regarding the rejection of claims 61-76, 80 and 81 under 35 U.S.C. §112, second paragraph, Appellants argue that the Examiner erred by determining that the parenthetical language in the clause, “decreases in radial thickness (between outer surface 71a and inner surface 72, 74) along its length” (claim 61) renders the claim unclear. Brief: 10. This argument is persuasive. While parenthetical language may give rise to a rejection for lack of clarity, in this instance the phrase is sufficiently clear in that it merely provides an explicit definition, i.e., between outer and inner, of what the term radial is already understood to mean.

Although the Examiner erred by determining that the parenthetical language renders claims 61-76, 80 and 81 indefinite, the rejection under 35 U.S.C. §112, second paragraph, is sustained, because the Appellants have not established that the Examiner erred in concluding that the language of the claims 61-76, 80 and 81 does not make clear the metes and bounds of their coverage.

It is not clear from claims 61-76, 80 and 81 whether the claims would be directly infringed only upon making, using, offering for sale, or selling the hub assembly in the deformed state, e.g., as depicted in Figure 7C, or if they would be directly infringed prior to the deformation by making, using, offering for sale, or selling the hub assembly in the deformable state, e.g., as depicted in Figure 7A. Claim 61 recites the combination as including a “deformable annular end portion,” which implies the claims cover the hub assembly in the deformable state, that is, prior to deformation, while at the same time requiring a “formed end,” which implies the claims cover the hub assembly in the formed state, that is, after the deformation. Additionally, some limitations such as, “the deformable annular end portion (71) being received through the opening (27) in the component (26) and being deformed generally radially outwardly and axially into a formed end (20) that holds the component (26) on the spindle (14),” seem to indicate that the claims are only infringed upon performing the step of deforming, e.g., the step depicted in Figures 7B to 7C. Because of this uncertainty the Examiner reasonably concluded that a potential infringer would be unable to accurately determine the metes and bounds of protection encompassed by claims.

Appellants argue that, “[i]t is plain that the claims are directed to a formed end.” Brief: 11. If claim 61 is directed to the assembly having a formed end, it is unclear how, in that claim, “the spindle (14) [has] an inner beveled surface (68) that is inclined inwardly toward the spindle rotational axis (X FIG. 1) from the deformable annular end portion (71)”, because the deformable annular end portion 71 does not exist when the assembly is in the formed state (See Fig. 1 and 7C). Additionally, if the claims are directed to the assembly having a formed end, it is unclear how “the deformable annular end portion (71) [has] a cylindrical outer surface (71a) and a tapered inner surface (72, 74) that tapers outwardly away from the spindle rotational axis (X) toward the outer end (78) so that the deformable annular end portion (71) decreases in radial thickness (between outer surface 71a and inner surface 72, 74) along its length in a direction toward its outer end (78)” because neither the deformable annular end portion 71 nor the outer end 78 thereof, which becomes curved surface 68, exists in the formed state (See Figs. 1, 7C and 3).

Appellants’ argument regarding similar limitations in issued claims (Brief:11-12; Re. Brief: 3-4) is not relevant to the particular issues presented in the claims under review in this application. We do not object to the notion that characteristics of an original or preform state may be important in contributing to the final structure of an apparatus, nor do we conclude that such characteristics are, per se, incapable of being used to clearly define the structure of a claimed final apparatus (Re. Brief: 4). When original or preform characteristics are claimed, however, they should be recited as just that, characteristics of an original or preformed state of the claimed apparatus and, not, as is done here, elements of the claimed final apparatus

for which protection is sought. Since the Examiner reasonably concluded that claim limitations requiring the final apparatus to exist in both the formed and the deformable state introduce ambiguity into the claims which render it unclear when the claims would be infringed, the rejection under 35 U.S.C. §112, second paragraph is sustained.

Although we have affirmed the rejection of claims 61-76, 80 and 81 under 35 U.S.C. §112, second paragraph, for the sake of completeness, the prior art rejections are addressed below.

The rejection of claims 61-76 under 35 U.S.C. §102(e) as being anticipated by Hofmann is reversed.

Claim 61 recites, “the curved outside surface (60) on the formed end (20) being continuously curved from the peripheral outside corner (64) of the formed end (20) adjacent the outer face (32) of the component (26) so that a point traveling along the curved outside surface (60) moves both axially outwardly⁵ and radially inwardly of the spindle axis.” The Appellants argue that the only corner of Hofmann that could reasonably be construed as the peripheral outside corner is the corner of the hub 1 which directly abuts bearing ring 3 at a point directly above the corner indicated by arrow r in Figure 3—a sharp corner. The Appellants acknowledge that the sharp corner is directly below and to the left of reference character α viewed in Figure 3,

⁵ It is noted that the term “axially outwardly [of the spindle axis]”, as defined in claim 61 is the direction which the curved outside surface faces (Claims Appendix: 19, ll. 5-6), i.e., to the right in Figure 3, as distinguished from the “outboard” direction of the spindle which is defined in the specification as to the right in Figure 1—which would correspond to left in Figure 3.

could reasonably be read as a peripheral outside corner, but disagree that this corner could reasonably be read as “closely adjacent” the outer face of the component. Brief 13-14; Re. Brief: 5. The Examiner opines that the corner where the straight portion of bead 9 meets the curved portion, just below the line associated with reference numeral 9 in Figure 3, may be read as the peripheral outside corner. Answer: 5-6. Regardless of which corner is adopted as the “peripheral outside corner,” Hofmann does not disclose each and every element of the claim.

If, as Appellants suggest, the corner directly abutting the bearing ring is read as the peripheral outside corner, Hofmann would not disclose the continuous curve required by the limitation quoted above. A point traveling radially inwardly from that corner would travel in a straight line (downward as viewed in Figure 3) as opposed to a continuous curve and would not travel axially at all. A point traveling along the continuously curved surface (up and to the right as viewed in Figure 3 from that corner to corner directly below and to the left of reference character α moves axially outwardly and radially *outwardly*, not inwardly, until the continuous curve ends at that sharp corner near reference character α . If the sharp corner near reference character α is read as the peripheral outside corner, a point traveling along the continuously curved surface (down and to the left as viewed in Figure 3) from that corner to the corner directly abutting the bearing ring moves axially *inwardly*, not outwardly until the continuous curve ends at that sharp corner directly abutting the bearing ring. A point traveling radially inwardly and axially outward from the sharp corner near reference character α (down and to the right as viewed in Figure 3) moves along a straight surface (see Answer: 5), not a continuous curve.

The point where the straight surface defining an angle from vertical measured by α meets the curved surface measured by radius R can not reasonably be construed as a “corner” as the Examiner suggests. The smooth point of transition where a line meets a curve is a point where the line is essentially tangent to that curve. There is no angle and infinite radius at such a transition and therefore it cannot reasonably be construed as a “corner” (Fact 5). The Examiner further asserts that, “[a] careful inspection [of Figure 3] of Hofmann will show that for a short distance the curved outside surface of the formed end starts its curve while it is still moving [axially] outwardly.” Answer: 5-6. It is well established that patent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue. *See, e.g., Hockerson-Halberstadt*, 222 F.3d at 956. To assert that there is some point above the curve having radius R that could reasonably be construed as a “peripheral outside corner” from which a point moves radially outward and axially inwardly before turning into the straight surface, where it is not clear from the figures, nor mentioned in the specification, amounts to speculation and conjecture and cannot form the basis of a rejection under 35 U.S.C. §102(e). Since Hofmann fails to disclose each and every element of claims 61 and 70 (Fact 3) the rejection of claims 61 and 70, and, additionally, of dependent claims 62-69 and 71-76, under 35 U.S.C. §102(e) as being anticipated by Hofmann is reversed.

The rejection of claims 80 and 81 under 35 U.S.C. §102(e) as being anticipated by Hofmann is affirmed.

The features relating to the curved outside surface, discussed above, are not present in claims 80-81. Hofmann discloses each and every feature of claims 80 and 81 (Facts 1 and 2, respectively). The limitation requiring, “the tapered inner surface...outwardly deformed along its length” does not necessarily require the surface to be outwardly deformed along its entire length as Appellants suggest. Brief: 17. The Examiner reasonably construed the phrase to include a surface that is outwardly deformed at at least some location along its length. Appellants note the benefits of their design as compared to Hofmann (Brief: 17), but since Appellants do not relate these benefits to any particular elements of claims 80 and 81, this does not advance Appellants’ argument that the Examiner erred by rejecting claims 80 and 81 as being anticipated by Hofmann. Accordingly, the rejection of claims 80 and 81 under 35 U.S.C. §102(e) as being anticipated by Hofmann is affirmed.

CONCLUSION OF LAW

On the record before us, Appellants have not established that the Examiner erred in rejecting claims 61-76, 80 and 81 under 35 U.S.C. §112, second paragraph, nor have Appellants established that the Examiner erred by rejecting claims 80 and 81 under 35 U.S.C. §102(e) as being anticipated by Hofmann. Appellants have established that the Examiner erred by rejecting claims 61-76 under 35 U.S.C. §102(e) as being anticipated by Hofmann.

DECISION

For the above reasons, the Examiner's rejection of claims 61-76, 80 and 81 under 35 U.S.C. §112, second paragraph is affirmed. The Examiner’s

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rejection of claims 80 and 81 under 35 U.S.C. §102(e) as being anticipated by Hofmann is affirmed. The Examiner's rejection of claims 61-76 under 35 U.S.C. §102(e) as being anticipated by Hofmann is reversed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). See 37 C.F.R. § 1.136(a)(1)(iv) (2007).

AFFIRMED-IN-PART

Vsh

H. DUANE SWITZER, JONES DAY
NORTH POINT
901 LAKESIDE AVENUE
CLEVELAND OH 44114-1190